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Impact of Contract Farming on Smallholder Farmers' Livelihood and Food Security in Kubau LGA, Kaduna State, Nigeria.

Martin Royal Okechukwu Onwunali*, Gloria Oluchi Oparandudu and Shuaibu Bako Musa
Department of Agricultural Education, School of Vocational and Technical Education, Federal University of Education, Zaria, Nigeria.

*Corresponding Author:
Email: martinroyal2002@yahoo.com

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Abstract

The study aimed at establishing influence of contract farming on smallholder farmers' livelihood and food security in Kubau Local Government Area, using descriptive survey design. The instrument used was questionnaire, validated by three experts and yielded reliability coefficient of 0.87, using Cronbach alpha. The instrument was randomly distributed to 194 farmers in a multi-stage sampling technique. Data were subjected to descriptive statistics and mathematical techniques while independent t-test ($P \leq 0.05$) was used to test hypothesis. Results revealed that male farmers (>72 %) within the ages of 30-39 (45 %) years, married (74 %) with tertiary education certificates (48 %) dominated farming activities of the contract farmers. Such farmers cultivated mostly maize using household number of 1-4 (64 %), in a farm size of 1.5-2.4 (54 %) ha^{-1}. However, with relatively low farming experience of 3-4 (58 %) years. Similarly, married male (73.4 %) within the ages of 40-49 (39.36 %) with secondary education dominated farming household of 5-9 (54.26 %) and farm size of 0.5-1.4 among non-contract farmers. However, with high > 6 (58.5 %) years farming experience compared to contract farmers. T-test value of 9.86 significantly revealed high grain output using contract farmers (57.17) compared to non-contract farmers (37.3). Such implied better livelihood of the participating farmers, with significantly (t-test value of 2.03) less problem indexes of 314.53 compare to 365.73 of non-contract. However, scarcity and high cost of fertilizer, market price fluctuation and inconsistent and poor implementation of government policy were major problems of the farmers. The significant output established a positive impact of contract farming on farmers' livelihoods. Hence the need for policies to encourage female participation, extension services, innovative production techniques and adequate supply of fertilizer with subsidy for sustainable crop production.

Keywords: Sustainable agriculture, Food security, Contract farming, Kubau.

INTRODUCTION

The global food crisis calls for a shift in crop production models or alternative strategies like precision agriculture, which uses GPS, drones, and sensors to optimize crop yields, reduce waste, and improve resource efficiency (Omoyajowo *et al*., 2022; Onwunali, 2024). Contract farming can enhance smallholder farmers' livelihoods and food security by providing access to reliable markets and promoting sustainable agricultural practices. Additionally, it can help mitigate the impacts of climate change, contributing to more resilient food systems. Furthermore, functional and sustainable organic and contract farming (Yegbemey *et al*., 2021; Ncube, 2020), among other strategies, remains essential for addressing the high dependency on low-income farmers and the conventional cropping system, which is associated with low output and environmental hazards. Such strategies will undoubtedly reduce the effects of climate change and land shortages due to competition with urbanization, industrialization, and disruptions caused by herders (Omoyajowo *et al*., 2022).

In Nigeria, small income farmers dominate farming and production on an average cultivable land of 1-3 hectares (Yakubu and Akanegbu, 2015; Amurtiya and Adewuyi, 2020). However, with low yield associated with inadequate finance and high interest rates of loan (Enwelu and Iyere-Freedom, 2023), use of local seeds (Ibrahim, 2018) and manual (traditional) application of agronomic practices (Hassan, Onwunali and Ibrahim, 2020) among others. Subsequently, evidence of strong influence of socio-economic characteristics of farmers on farming has been reported (Onwunali, Oparandudu and Bamali, 2023a).

Contract farming is a vertical integration production system that subjects farmers to produce specific quality and quantity commodity based on buyer's specifications targeting a particular market and price (Miyata, Minot, and Hu, 2009; Ton, Minot and Sawyer, 2016; Ton, Vellema, Desiere, Weituschat and D'Haese, 2018). In other words, farmers are hired by private firms, who finance their farming activities through supplies of input, logistics and expertise on agreed terms (Will, 2013; Yunusa and Giroh, 2017; Mencken and Bellemare, 2020; Hoang, 2021). However, the decision to enter a contract farming is influenced by the scale of operations, access to resources, and risk-sharing mechanisms.

Globally, the concept is not new, but in Africa, the private sector uses it to improve the livelihoods of farmers through the production of staple food crops (Iro, 2016). In Nigeria, firms like OLAM Nigeria limited grows rice, cotton and ginger, NESTLE SLABMARK concentrates on soya bean while British American Tobacco Isheyin Agronomy Limited (BATIAL) produces tobacco with farmers (Akanbi, Alarape and Olatunji, 2019).

Generally, based on type of contract, product, degree of vertical coordination and number of stakeholders, different modes of operation exist (Eton and Shepherd, 2001). Models available in Nigeria, include Public Private Partnership which provides input and services for vertical coordination (Ncube, 2020) and Informal model, mostly small enterprises that concentrate on fruits and vegetable processing (Hung and Bokelmann, 2019). Others are Intermediary Operators which involve corporate subcontract farmers (Olomola, 2010) and the major processing corporation contracts (Centralized model) of crops (Harish, 2019). FAO (2021) also reported the existence of Necleus Estate Model which contracts with independent producers on perennial plantations.

Reports have shown that contract farming played a significant role in the welfare and livelihood of smallholder farmers, increased crop production, introduced better technology delivery, coordinated producers and consumer's market as well as providing strong grass-root linkages (FAO, 2012; Girma and Gardebroek, 2015; Iro, 2016; Gemechu, Jema, Belaineh and Mengistu, 2017; Nazifi, Suleiman, Bello and Suleiman, 2021). Ray, Clark and Waley (2021) reported that, contracts farming benefited large contractors in income security and training of farmers in the adoption of machinery and new chemicals. Hence, it saved farmers from formal money lenders with high interest rates, due to prompt payments, thereby insuring output against market risks and making it independent of market uncertainties. Furthermore, the concept was also associated with increased access to technical support, input, output, gross margin, net profit, maintained international standards criteria for enterprises, women and youth's empowerment, inculcated commercial culture and provided opportunities for employment of labor (FAO, 2012;

Maertten and Velde, 2017; Usman and Zeleke, 2017; Mark, Niels, Caroline, Sudha and 2022).
Despite the enormous benefits, challenges are bound for small contract farmers (Ojo and Ajayi, 2021). Such challenges include lack of trust and corruption due to exploits from officials on one side and the farmers inadequacies on the other side (Da-Silva, 2005). Other challenges include risks of introduction of new crops, crop incompatibility, inaccurate market strategy and new and unsuitable technology (Hoang, 2021). Consequently, impeding adoption and adaptation of technologies resulting in collapse of targeted goals (Eaton and Shepherd, 2001).

Justification of the study

The current food insecurity crisis due to low productivity and dependent on importation demands that the small income farmers that controls food production with an average of 1-3 hectares should be empowered to improve output. Reports have shown that such farmers lack finance and finds it difficult to access credit facilities due to unaffordable interest rate, hence resort to traditional techniques (Omodara, Onwunali and Hiikyaa, 2021; Onwunali, Oparandudu and Ajiji, 2023). Therefore, the concept of contract farming will no doubt facilitate empowerment and integration of small scale towards commercial farming revolution as the firms provide funds, farming technology and marketing. However, there is speculation of bottlenecks such as exploitation, use of farmers as cheap labour and transfer of production risks to farmers. The paper is structured around three key areas, one is on socio-economic characteristics of farmers that determines their engagement particularly in crop production, two is benefit of the greater knowledge, training and input in farmers' income and the constraints, considering that the farming system is recent and inconsistent.

In view of the above reasons, the study 'impact of contract farming among smallholder farmers' livelihood in Kubau Local Government, Kaduna State' where small-scale and low-cost farmers play significant role to the region's GDP becomes necessary.
Specifically, the study sought to;

i. Assess the socio-economic characteristics of contract and non-contract the farmers that determine their engagement with the agricultural firms,
ii. Identify crops of interest of the agricultural firms in Kubau,
iii. Assess the output of contract and non-contract farmers
iv. Identify problems associated with contract and non-contract farming

Research Questions

i. How does the socio-economic characteristics of the farmers impact on contract farming?
ii. Does contract farming improve the output of farmers?
iii. What are the constraints of contract and non-contract farmers?

Research Hypotheses

Contract farming is a new concept of growing crops and empowering farmers in Kubau Local Government of Kaduna State. Several State Registered Firms engage farmers base on terms, provide inputs and determine make channels and margins. The increasing influx of firms and farmers' interest in participation demands that the following null hypotheses be tested to ascertain whether the output under contract farming is same, against or in favor,

H_{O1}: There is no significant ($p < 0.05$) difference between the yield of contract and non-contract farmers
H_{O2}: The associated problems of contract farmers has no significant difference with non-contract farmers

MATERIALS AND METHOD

Description of the Study Area

Kubau Local Government Area (LGA) is in the North-Eastern part of Kaduna State and lies at longitude 8°3′ North of the Greenwich Meridian and Latitude 11°06′ East of the Equator. It shares boundaries with Ikara LGA to the North-East, Soba LGA to the West, Kauru LGA to the South-West and Lere LGA to the South-East, and covers an area of approximately 2,363 km^2 (Ikpe, Kilani, Grace, Shamsu, Saleh and Ariko, 2023). Kubau LGA had a population of 282,045 people during the 2006 census (NPC, 2006) and a projected population of 414,700 in 2022 using a growth rate of 3.12% (Mohammed, Ahmadu, Shuaibu and Adewale, 2022).
Administratively, the LGA is divided into 11 wards namely, Kubau, Dutsen-Wai, Pambegua, Zuntu, Damau, Karreh, Anchau, Haskiya, Kargi, Mah and

Zabi, and are characterized by a well-developed grass layer, shrubs. They enjoy a tropical climate with two distinct (dry and wet) seasons (Mohammed, *et al*. 2022), hence the inhabitants are agrarian in nature.

Experimental Design

A survey design was use distribute a total of 200 closed structured questionnaire were purposely and randomly distributed (Ray *et al*., 2021) to contract farmers working for Babban-Gona firms, AFEX, Arzikin Noma, Bunkasan Manoma, Setlight, F.Man/CBN firms and non-contract farmers in Kubau, Dutsen-Wai, Pambegua, Damau, Karreh, Anchau, Kargi and Zabi wards. The instrument was validated by three experts on content, facial and language appropriateness. In each ward, 25 farmers were randomly selected for investigation. Of the 100 each of the instruments distributed to contract and non-contract farmers, only 94 were retrieved from non-contract farmers, making a total of 194. The questionnaire comprised of four sections: demographic information of the farmers, crops grown, product output of the farmers and problems faced by each group of farmers. A 5-point Likert scale was used to evaluate the problems of farmers as Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD), assigned values of 5, 4, 3, 2 and 1, respectively. A check list on production was also prepared and used to interview farmers.

Data Analysis

Data on demographic information and product output were analyzed using descriptive statistics, while independent t-test ($p<0.05$) was used to test the hypothesis. The farmers output reliability coefficient scale was 0.87 and problem coefficient scale was 0.84, giving a mean of 0.86 for the instrument, using Cronbach alpha reliability tool. The problems of contract and non-contract farmers were subjected to mathematical technique called problem confrontation index (PCI) following Aurup, Monirul and Tasm, (2017) and Onwunali *et al*. (2023b) as thus.

$PCI = [P_{SA}x5] + [P_{A}x4] + [P_{U}x3] + [P_{D}x2] + [P_{SD}x1]$

Where PCI = Problem Confrontation Index
SD = Strongly Disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly Agree

The expected range of problems confrontation index was 1 to 500 for contract farmers and 1 to 470 for non-contract farmers. The acceptance range for the research questions were adopted from Antiabong and Etop (2018), and amended as follows,

1 = 1.0 - 1.49 Strongly Disagree
2 = 1.5 - 2.49 Disagree
3 = 2.5 - 3.49 Undecided
4 = 3.5 - 4.0 Agreed
5 = 4.1 - 5.0 Strongly Agree

Mean benchmark of ≥ 3.0 determined decision for significance of problem acceptable level while below < 3.0 is not acceptable. An independent t-test was used to test hypothesis at $p \leq 0.05$, using IBM SPSS Statistical 23.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Farmers

Results (Table 1) revealed that majority of the farmers (72% and 73.4%) were males for both contract and non-contract farmers, respectively. Males are believed to be more readily available for energy demanding tasks involved in farm activities. The results further revealed that female farmers under contract farming were higher (28%) compared to non-contract farmers (26.60%), probably due financial incentives of the firms and gender inclusion policy adopted worldwide to bridge the gender gap across various organizations. Yegbemey, Adimi, Assogba, and Djebbari (2021) reported that contract farming reduced gender gap and increased net economic benefits for both women and men in farming activities.

Furthermore, contract farmers (45%) were between the productive ages of 30-39, married (74%) with household size of 1-4 (64%), while non-contract farmers were relatively older and ranged between 40-49 (39.36%) years, also married (78.72%) with household size of 1-4 (54.26%). This implied that younger and energetic farmers capable of undertaking any successful agricultural task participated in contract farming. Ikpe, Kilani, Grace, Shamsu, Saleh and Ariko (2023) reported that older farmers are reluctant to risk and rigid to changes than younger farmers. Hence making it difficult accept, adopt and adapt new technologies for either higher yield in production or lower risks, or both.

Results also showed that, majority of contract farmers (48%) acquired tertiary education certificate while secondary education (38%) dominated non-contract farmers. Such educational advantage will no doubt facilitate the understanding of innovation technology towards increasing yield. In terms of size of farmland, majority of contract farmers (45%) cultivated between 1.5-2.4 hectares, against the non-contract farmers (47.87%) with 0.5-1.4 hectares. This maybe probably due to funding and incentives such as fertilizer, improved seeds, pesticides *inter alia* provided by the contract firms to facilitate urge and willingness to expand their arable land. On farming experience, contract farmers (58%) had relatively less farming experience (4 years), than non-contract farmers (58.51%; >6), because it is a new concept, and firms were interested in young farmers that can accomplish required task with little supervision.

Table 1: Socio-economic Characteristics of Farmers in Kubau Local Government Area

Variables		**Contract Farmers**		**Non- contract Farmers**	
		F	**%**	**F**	**%**
Sex	Male	72	72	69	73.40
	Female	28	28	25	26.60
Age	20-29	7	7	14	14.89
	30-39	45	45	31	32.98
	40-49	38	38	37	39.36
	>49	10	10	12	12.77
Educational status	Non formal	16	16	22	23.40
	Primary	2	2	12	12.77
	Secondary	34	34	36	38.30
	Tertiary	48	48	24	25.53
Marital status	Single	18	18	15	15.96
	Married	74	74	74	78.72
	Divorce	8	8	5	5.32
Household size (number)	1-4	64	64	51	54.26
	5-9	29	29	32	34.04
	10-14	6	6	9	9.57
	15-19	-	-	1	1.06
	>19	-	-	1	1.06
Farm size (ha)	0.5-1.4	15	15	45	47.87
	1.5-2.4	45	45	30	31.91
	2.5-3.4	26	26	10	10.64
	3.5-4.4	9	9	3	3.19
	4.5-5.4	2	2	2	2.13
	>5.4	4	4	4	4.26
Farming experience (yrs)	1-2	29	29	8	8.51
	3-4	58	58	26	27.6
	5-6	8	8	5	5.32
	>6	5	5	55	58.5
Total		**100**		**94**	

***Source*:** Field survey (2023), ha = Hectare, yrs = Years, F = Frequency, % = Percentage

Major crops of farmers

Field observation revealed sole cultivation of maize as dominant crop for both farm types, 63 % and 44. 68 %, respectively followed by inter-cropping of maize and soybean, and maize and rice (Table 2).

Results also revealed relatively high sole cultivation of soybeans (19.15 %) among non-contract farmers. The consistent use of soybeans according to farmers were hinged on awareness and association of the crop to soil conservation and nutrient supply particular among contract farmers.

Such seeds were mostly obtained from seed companies by contract farmers and or from parents and friends by non-contract farmers. In terms of fertilizers, both farm types combined granular and organic manures, using band placement and broadcasting application methods. However, while the contracting firms supply inputs for their farmers, who combined farming with trading, civil

service and driving jobs, non-participating farmers privately funded their activities through their meagre trading of farm produce. The study also investigated production assistance of extension agents from government, and farmers under contract witnessed moderate assistance while the non-contract did not.

Table 2: Cultivated Crops of Interest by Farmers of Kubau LGA of Kaduna State, 2023

Crops Cultivated	Contract Farmers		Non-Contract Farmers	
	F	%	F	%
Maize only	63	63	42	44.68
Rice only	1	1	4	4.26
Soybeans only	-	-	18	19.15
Wheat only	1	1	-	-
Maize and rice	12	12	9	9.57
Maize and soybeans	20	20	8	8.51
Maize and cowpea	-	-	1	1.06
Maize and pepper	-	-	1	1.06
Maize, rice and soybeans	2	2	-	-
Maize, rice and pepper	1	1	2	2.13
Rice and soybeans	-	-	7	7.45
Rice and pepper	-	-	1	1.06
Soybeans and pepper	-	-	1	1.06
Total	**100**	**100**	**94**	**100**

***Source*:** Field Survey (2023), F = Frequency, % = Percentage

Grain yield of the Farmers

Results (Table 3) revealed that contract farmers had a high yield of > 6000 Kg/ha (51) compared to average yield of 3800 Kg/ha of most of the contract farmers (37). Such result indicated was attributed to input and technological assistance of the contracting firms through seeds, fertilizer, pesticides supplies. Field observation also revealed that firms assist farmers timely cultivation by land preparation as well as in post-harvest handling of produce and adoption new farming techniques which was facilitated by their level of education and binding contract agreement. The t-test of value 9.86 statistically confirmed high significance ($p \leq 0.05$) between the yield of contract and non-contract farmers with corresponding means of 57.17 and 37.30 bags, respectively. Hence, reject the hypothesis that there is no significant difference between output of contract and non-contract farming. Earlier, Nazifi *et al.* (2021) reported that access to credit and extension service as well as accessible roads to their farms were responsible for increased yield of contract farmers, contrary to non-contract farmers where few have the opportunity. The relatively high yield evidently confirmed the potential benefits of contract farming through efficient farming practices which positively increased yield (Ton, Vellema, Desiere, Weituschat, D'Haese, 2018).

Table 3: Relative output in kg /ha Farmers in Kubau LGA, Kaduna State, 2023.

S/No.	Yield (Kg/ha)	Contract Farmers	Non-contract Farmers
1	1500 - 3000	03	35
2	3100 - 4500	17	37
3	4600 - 6000	29	11
4	>6000	51	11
Total		**100**	**94**

***Source*:** Field survey (2023)

Table 4: Comparison of output of Contract and Non-Contract Farmers in Kubau LGA, 2023

Farm Types	N	Mean	SD	Cal-value	Df	T-tab	Decision
Contract	100	57.17	12.89	9.86	192	1.96	Significant
Non-Contract	94	37.30	15.13				

***Source*:** Field survey (2023), N = 100 for contract farmers, n = 94 for non-contract farmers
Cal.-value = calculated T-test, T – tab = tabulated value

Results (Table 5) showed average problem confrontation index (PCI) of 313.87 out the 500 and mean of 3.14 among the contract farmers, indicating that despite the assistance in farm input and innovative technology the farmers are still confronted with some problems. Specifically, nine major problems were identified with the high cost of fertilizer (4.34), market price fluctuation (3.97) and access to credit and finance (3.91) topping the table. Others include inadequate extension services, unfair and delay in payment, pest and diseases control, high dependency on firms, legal disputes and sources of seeds and availability. However, farmers disagreed that issues like environment, force to use specific input, lack of transparency of firms, poor storage facilities, lack of technical support and government policy does not have impact on their performance.

These challenges span various facets of agricultural operations, from input accessibility to market dynamics and as such requires a multi-stakeholder approach that will encompass government agencies, financial institutions, and contracting firms. Initiatives such as subsidizing key inputs, stabilizing market prices, and improving extension services could contribute to alleviating the identified challenges.

Table 5: Problems of Contract Farmers in Kubau LGA, Kaduna State, 2023 N=100

S/No.	Problems	SA	A	U	D	SD	CI	$\underline{x}$	Decision
1	High cost of fertilizer and availability	355	20	45	10	4	434	4.34	Agreed
2	Market price fluctuation	90	276	24	4	3	397	3.97	Agreed
3	Access to credit and finance	240	100	6	40	5	391	3.91	Agreed
4	Inadequate extension officers	20	236	60	22	6	344	3.44	Agreed
5	Unfair pricing and payment delay	95	176	36	14	18	339	3.39	Agreed
6	Pest and disease control	15	188	120	0	10	333	3.33	Agreed
7	Dependency on the contracting firm	35	180	84	10	15	324	3.24	Agreed
8	Legal disputes	35	36	231	12	1	315	3.15	Agreed
9	Source of seed and availability	45	200	6	28	25	304	3.04	Agreed
10	Environmental concern	5	88	168	0	21	282	2.82	Disagreed
11	Pressure to use specific input	100	60	30	46	32	268	2.68	Disagreed
12	Lack of transparency on the contract	10	88	125	14	28	265	2.65	Disagreed
13	Poor storage facilities	30	88	90	28	28	264	2.64	Disagreed
14	Lack of technical support and training	5	56	114	36	29	240	2.40	Disagreed
15	Government Policy	30	16	75	44	43	208	2.08	Disagreed
	Grand Total ($\underline{x}$)						**313.9**	**3.14**	

***Source*:** Field Survey (2023), **Key:** SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree, CI = Confrontation Index, $\underline{x}$ = Mean

Results (Table 6) revealed an average PCI of 365.7 out of 470 and mean of 3.89, indicating that non-contract farmers experienced more problems in farming. Of the 11 identified problems, 10 were major except for environmental factors (2.55) which farmers disagreed with to impede their activities. Specifically, the high cost of fertilizer (4.87), government policy (4.74), poor access to credit/finance (4.36), inadequate extension services (4.22) and lack of technical support and training (4.19) dominated problems of non-contract farmers. The significant t-test value of 2.03 (Table 7) indicated that contract farmers (314.53) had relatively less problem index than non-contract farmers (365.73), hence reject the hypothesis that there is no significant difference in problems of the two farm types. Such difference was attributed to guidance, technical assistance, access to credit, farm facilities, input and established markets provide by firms to their farmers.

CONCLUSION

The results evidently showed improved yield output and relatively less production problems to contract farmers attributed to firms' incentive to farmers and by implication, improved livelihood of farmers for sustainable food production. However, additional effort towards fertilizer subsidy and availability, and market price control, financial assistance, improved extension service, innovative technology on pests' control and provision of certified seed by stakeholders will improve the activities of the farmers and contract firms.

Table 6: Problems of Non-Contract Farmers in Kubau LGA, Kaduna State 2023

S/No.	Problems	SA	A	U	D	SD	CI	$\underline{x}$	Decision
1	High cost of fertilizer and poor availability	425	32	0	0	1	458	4.87	Agreed
2	Government Policy	385	56	3	0	2	446	4.74	Agreed
3	Access to credit and finance	275	108	9	18	0	410	4.36	Agreed
4	Inadequate extension services	145	244	6	0	2	397	4.22	Agreed
5	Lack of technical support and training	170	212	6	2	4	394	4.19	Agreed
6	Market price fluctuation	65	220	72	4	0	361	3.84	Agreed
7	Pest and disease control	35	292	30	0	3	360	3.83	Agreed
8	Poor storage facilities	20	192	117	6	0	335	3.56	Agreed
9	Source of seed and availability	140	144	6	16	20	326	3.47	Agreed
10	Crop quantity standard	115	118	57	2	4	296	3.15	Agreed
11	Environmental factors	65	20	90	38	27	240	2.55	Disagreed
	Grand Total ($\underline{x}$)						**365.7**	**3.89**	

***Source*:** Field Survey (2023), SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree, CI = Confrontation Index and $\underline{x}$= Mean

Table 7: Comparison of Problems of Contract and Non-Contract Farmers in Kubau LGA, 2023

Variable	N	Mean	SD	Cal-value	Df	T-tab	Decision
Contract	15	314.53	62.08	2.03	24	1.94	Significant
Non-Contract	11	365.73	64.76				

***Source*:** Field Survey (2023), N = 15 for contract, 11 for non-contract, SD = Standard Deviation, DF = Degree of Freedom, Cal-value = Calculated value, T-tab = Tabulated Value.

RECOMMENDATIONS

Based on the findings, the study recommended the following:

1. Farmers according to findings are technically sound in crop production and cultivated 1.5 to 2.4 hectares which is relatively small for sustainable livelihood, therefore, there is a need for adequate funding for expansion of arable land and improved input by the firms
2. Field observation revealed relatively low farmer extension ratio, there is a need for increased farmers' and extension ratio and increased field visits to update farmers on current innovations and technologies of crop production.
3. Field observation also reveals delayed supply of inputs to contract farmers which negatively affects farmers activities and subsequently reduced yield. Therefore, there is a need for early supply of input to registered farmers, properly guided and effective monitored to reduce doubts of mistrust and encourage early planting among participating farmers.

Data Availability Statement

The data supporting the findings of this study could be provided by the corresponding author upon reasonable request.

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Ethical Statement

This study was conducted in accordance with the ethical standards of the Federal University of

Education, Zaria, and written informed consent was obtained from all participants.

REFERENCES

Akanbi, S. O., Alarape, W. I., & Olatunji, O. S. (2019). Economic implication of contract farming on small-scale rice farmers in Kwara State, Nigeria. *Agrosearch*, 19(2): 26-40.

Amurtiya, M. & Adewuyi, K. A. (2020). Analysis of tomato production in some selected local government areas of Kano State, Nigeria. *Symposium on Agri-Tech Economics for Sustainable Futures – 2020. Pp. 80-88. https//:www.researchgate. net/publication/344727173*

Antiabang, O. E & Etop, N. E. (2018). Accessibility to funds and farmers' involvement in large scale production of poultry products for food security in Akwa Ibom State. *Journal of Agricultural Education Teachers' Association of Nigeria*, 2(2):128-136

Aurup, R. D., Monirul, I. & Tasm, U. A. (2017). Adoption of conservation agriculture in Bangladesh: Problems and prospects, *World Journal of Agricultural Research*, 5 (5):265-272

Da Silva, C.A.B. (2005). The Growing Role of Contract Farming in Agri-Food Systems Development: Drivers, Theory and Practice; Food and Agriculture Organization of the United Nations (FAO): Rome, Italy.

Eaton, C. & Shepherd, A.W. (2001). Contract Farming Partnerships for Growth; Food and Agricultural Organization of the United Nations: Rome, Italy.

Enwelu, I. A. & Iyere-Freedom, C. J. (2023). Effects of Contract Farming Models for Increased Productivity in Nigeria: An Empirical Evidence. *Nigerian Agricultural Journal*, 54(1): 420-424.

FAO (2012). Guiding principles for responsible contract farming operations. Rural Infrastructure and Agro-Industries Division, http://www.fao.org/docrep/016/i2858e/i2858e. pdf, Rome, Italy.

FAO (2021). Contract Farming Resource Centre. www.fao.org/in-action/contract-farming/en/

Gemechu, M., Jema, H., Belaineh, L., & Mengistu, K. (2017). Impact of Participation in Vegetables Contract Farming on Households' Income in the Central Rift Valley of Ethiopia. *American Journal of Rural Development*, 5(4): 90–96.

Girma, J. & Gardebroek, C. (2015). The impact of contracts on organic honey producers' incomes in south western Ethiopia. *Forest Policy and Economics*, 50: 259–268.

Harish, N. (2019). Impact of contract farming on economic status of the farmers practicing contract farming. *International Journal of Arts, Science and Humanities*, 7(2): 39-46

Hassan, A., Onwunali, M. R. O. & Ibrahim, S. (2020). Small Scale Rice Farmers Production Information Needs for Sustainable Development in Bakori Local Government Area of Katsina State. *International Journal of Operational Research Management, Social Sciences and Education*, 6(1):371-383

Hoang, V. (2021). Impact of Contract Farming on Farmers' Income in the Food Value Chain: A Theoretical Analysis and Empirical Study in Vietnam. Agriculture 797. https://doi.org/10.3390/ agriculture11080797.

Hung, A. N. & Bokelmann, N. (2019). Smallholders preferences for different contract farming model; Empirical evidence from sustainable certified coffee production in Vietnam. *Sustainability,* 11(14):37-99.

Ikpe, I., Kilani, M. O., Grace, I. J., Shamsu, A., Saleh, N. & Ariko, J. D. (2023). Assessment of Farmers' Perception and Awareness of Climate Change Issues and Adaptation Strategies in Kubau Local Government Area, Kaduna State, Nigeria. *A Paper presented at the 62nd Annual National Conference of Association of Nigerian Geographers (ANG-UNN 2022) University of Nigeria, Nsukka, Nigeria, held 7th-11th February.*

Iro, I. (2016). Empirical evidence on contract farming in northern Nigeria: case study of tomato production. *Asian Journal of Agriculture and Rural Development*, 6(12): 240-253.

Maertens, M. & Velde, K. V. (2017). Contract-farming in staple food chains: The case of rice in Benin. *World Dev*., 95: 73–87.

Mark, V., Niels, F., Caroline, H., Sudha, N. & Helena, P. N. (2022). Twenty-five years of Living Under Contract: Contract farming and agrarian change in the developing world. *Journal of Agrarian Change*, 22: 3–18.

Mencken, E. M., & Bellemare, M. F. (2020). Smallholder farmers and contract farming in developing countries. *Proceedings of the National Academy of Sciences*, 117(1): 259-264

Minot, N., & Sawyer, B. (2016). Contract Farming in Developing Countries; Theory, Practice, and Policy Implications. International Food Policy Research Institute Washington. D.C. 123-158.

Miyata, S. Minot, N. & Hu, D. (2009). Impact of contract farming on income: Linking small farmers, packers, and supermarkets in China. *World Dev*., 37: 1781–1790.

Mohammed, N. B., Ahmadu, A. A., Shuiabu, U., & Adewale, A. (2022). Analysis of Flood Risk along Galma Dam in Kubau Local Government Using Geospatial Technique. *Journal of Agricultural Extension and Development*, 22(4): 3279-8992.

Nazifi, B., Suleiman, A., Bello, M. B. & Suleiman, M. S. (2021). Impact of Contract Farming on Productivity and Food Security Status of Smallholder Maize Farmer's Households in Kano and Kaduna States, Nigeria. *International Journal of Agriculture, Environment and Food Sciences*, 5(4): 571-579. Doi: https://doi.org/10.31015/jaefs.2021.4.17

Ncube, D. (2020). The Importance of contract farming to small-scale farmers in Africa and the policy implications; *A review seenario. The Open Agriculture Journal*, 14(1): 22-43.

Ojo, M. A. & Ajayi, O. M. (2021). Contract farming and the challenges of rural development in Nigeria. *Journal of Rural Sudies*, 82: 198-207.

Olomola, A. S. (2010). Enhancing productivity, income and market access of rural producers in Africa: The case of contract farming in Nigeria. *Paper Presented at The Inaugural National Science Foundation (NSF) Joint Workshop of the African Economic Research Consortium (AERC) and the International Growth Centre (IGC) held in Mombassa, Kenya.* Pp. 28.

Omodara, A. A., Onwunali, M. R. O. & Hiikyaa, N. A. (2021). Evaluation of crop production innovation strategies and farmer's education needs for sustainable production in Kauru LGA, Kaduna State. *Zaria Journal of Educational Studies*, 21(1): 1-8.

Omoyajowo, K. O., Omoyajowo, K. A., Bakare, T. I., Ogunyebi, A. L., & Ukoh, S. (2022). Reflections on the nexus between climate change, food security, and violent conflicts: A tour through the Nigeria experience. *Ecological Safety & Balanced Use of Resources*, 25(1), 22-30.

Onwunali, M. R. O., Oparadudu, G. O. & Ajiji, V. I. (2023b). Influence of Banditry on agricultural activities and livelihood of farmers in Basa LGA, Plateau State, Nigeria. *Advances in Social Sciences Research Journal*, 10(9): 398-407.

Onwunali, M. R. O., Oparandudu, G. O., Bamali, S. I & Patrick, B. R. (2023a). Assessment of ginger production value chain information needs for sustainable livelihood in Kachia Local Government Area. *Science World Journal*, 18(2): 308-314

Ray, N., Clark, G. & Waley, P. (2021). Impact of contract farming in welfare and livelihood of farmers: A village case study from West Bengal. *Journal of rural studies*, 86: 127-135, https://doi.org/10.1016/j.jrurstud.2021.06.00

Ton, G., Vellema, W., Desiere, S., Weituschat, S., & D'Haese, M. (2018). Contract farming for improving smallholder incomes: What can we learn from effectiveness studies? *World Development*, 104: 46-64.

Usman, S. & Zeleke, A. (2017). Characterization of malt barley based farming system in bale highlands and West Arsi zone of Oromia South Eastern Ethiopia. *Journal of Agricultural Economics and Rural Development*, 3(2): 215–222.

Will, M. (2013). *Contract farming handbook*: *A practical guide for linking small-scale producers and buyers through business model innovation*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany, 1-116.

Yakubu, M., & Akanegbu, B. (2015). Neglecting agriculture and its consequences to the Nigerian economy: An analytical synthesis. *European Journal of Research in Social Sciences*, 3(3): 12-18.

Yegbemey, R. N., Adimi, E. B. O., Assogba, J. D. & Djebbari, H. (2021). Contract Farming Can Bridge Knowledge and Productivity Gender Gaps: Evidence from an Experimental Study in Benin. Partnership for Economic Policy. Retrieved from https://www.africaportal.org/publications/

Yunusa, P. M. & Giroh, D. Y. (2017). Determinants of Youth Participation in Crops production in Song Local Government Area of Adamawa State, Nigeria. *Scientific Papers-Series Management Economic Engineering in Agriculture 17(3*): 427- 434

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